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ABSTRACT

This course outline is a guide for teaching the principles and basic fundamentals of beginning skin and scuba diving in grades 7-12. The course format includes lectures, skills practice, films, and tests that focus on mastery of skills and understanding correct usage of skin and scuba equipment. Course content includes the following: (a) history, (b) safety procedures, (c) principles and physiological effects, (d) terminology, (e) social and ethical values, (f) proper care and use of skin and scuba and equipment, and (g) basic skills of skin scuba diving. Warm-up exercises and lead-up activities are illustrated. Resources for teacher and pupils are recommended. Procedures for giving a skills test are outlined. (A six-item bibliography is included.) (PD)

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BEGINNING SKIN AND SCUBA DIVING

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PHYSICAL EDUCATION

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PHYSICAL EDUCATION

Written by

Millie Roberts

For The

DIVISION OF INSTRUCTION

Dade County Public Schools

Miami, Florida

1971

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BEGINNING SKIN AND SCUBA DIVING

I. COURSE GUIDELINES FOR COURSE NUMBER

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A. Student Classification: Coeducational
B. Grade Level: 7 - 12
C. Level of Performance: Beginning
D. Suggested Prior Experience: Red Cross Swimmer Rating
E. Subject Status: Elective
F. Length of Unit: 9 weeks

II. COURSE DESCRIPTION AND ACCREDITATION STANDARD BROAD GOAL

Junior High: 9.8416 (1) a,b,d,i,j
Senior High: 9.9420 (1) a,b,c

A. Description

Beginning skin and scuba diving is designed to teach the principles and basic fundamentals involved in order that students attain a sufficient level of skill to enjoy the sport as a lifetime sport in a school and a leisure time situation.

B. Methods and Evaluation

The course will consist of lectures, practice sessions of the skills presented, films to be viewed, and written and skill tests.

C. Areas of Concentration

Class periods will be devoted to the mastery of skills, understanding the correct usage of skin and scuba equipment and the opportunity to perform at least one ocean dive.

III. COURSE OF STUDY BEHAVIORAL OBJECTIVES

A. Observation Skills Objective: 40% of Unit Grade

1. State Accreditation Standard: Junior High 9.8416 (2) a,s
   Senior High 9.9420 (2) a,b

   All students will demonstrate ability in skin and scuba diving principles and fundamentals which will be practiced and developed in class periods by means of drills and water practices. The majority of students will display sufficient ability to participate in all of the activities and will be measured by competencies described in the identification of each skill listed in the course content. Each student's progress and performance in the skills listed below will be evaluated by teacher judgement by observation or checklist.

   a. Swim 400 yards without fins.
   b. Tread water, feet only, for 3 minutes.
   c. Tow an inert swimmer 50 yards without fins
   d. Swim underwater for 25 yards without fins
   e. Proper use of mask, fins, and snorkel
   f. Equalizing pressures
   g. Use of tanks and regulators
   h. Personal safety skills
   i. Means of submerging

2. State Accreditation Standard: Junior High 9.8416 (2) c,t
   Senior High 9.9420 (2) c,d

   At least 75% or the students are able to demonstrate the proficiencies listed in 1. a-i.

B. Basic Skills Objective: 20% of Unit Grade

1. State Accreditation Standard: Junior High 9.8416 (2) a,s
   Senior High 9.9420 (2) a,b

   All students will participate and be rated in the following skills tests and the majority of students will achieve an average score or better. These tests will be set up and administered according to the scoring and procedure specifications listed in Section VI or other authoritative sources.

   a. Buddy breathing
   b. Station-to-station breathing
   c. Entries
   d. Doff and Don
   e. Retrieving and clearing of mask, fins, and snorkel

2. State Accreditation Standard: Junior High 9.8416 (2) c,t
   Senior High 9.9420 (2) c,d

   At least 75% of the students are able to demonstrate the proficiencies listed in 1. a-e.

C. Course Content Knowledge Objective: 20% of Unit Grade

1. State Accreditation Standard: Junior High 9.8416 (2) a,s
Senior High 9.9420 (2) a,b

All students will respond in writing to a test on skin and scuba diving and the majority of students will achieve an average or better score. The test will represent 20% of the unit grade and will be based on the Beginning Skin and Scuba Diving Quinmester Unit course content and class discussions, and will include some questions in all of the following areas.

a. History
b. Safety procedures
c. Principles and physiological effects
d. Terminology
e. Proper care and use of skin and scuba equipment

2. State Accreditation Standard: Junior High 9.8416 (2) c,t
Senior High 9.9420 (2) c,d

At least 75% of the students are able to demonstrate the proficiencies listed in 1. a-e.

D. Social and Personal Attitudes Objective: 20% of Unit Grade

1. State Accreditation Standard: Junior High 9.8416 (2) a,s
Senior High 9.9420 (2) a,b

Social and personal attitudes displayed by all students will be evaluated by observation, checklist, and/or annotation by the teacher throughout the entire unit, and it will represent 20% of unit grade. The teacher will motivate an atmosphere wherein the majority of the students will respond to this development and exhibit desirable behavior. This evaluation will be based on the following social and personal attitudes:

a. Alertness to class procedures and activities
b. Fairness to other students and teacher
c. Emotional control
d. Consideration of others
e. Team work
f. Willingness to participate regardless of degree of skill

2. State Accreditation Standard: Junior High 9.8416 (2) c,t
Senior High 9.9420 (2) c,d

At least 75% of the students are able to demonstrate the proficiencies listed in 1. a-f.

IV. COURSE CONTENT
(This section may be duplicated for distribution to students).

A. History of Skin and Scuba Diving

As early as Biblical times, man sought to increase his swimming skills and took to wearing flippers and hand paddles. Later a hollow reed was used to help man breathe while under water. Man continued to swim underwater not only for pleasure, but also as a means of support. However, it was not until the late 1920's that man was able to see as well under water as he could above it. Goggles were now introduced, mostly by the Japanese pearl divers.

The next step was to have air pumped to man or to take it with him. The diving suit was introduced first, but the hose feeding him air was too binding and man could not move about freely. Fleuss developed the first closed-circuit unit in 1878, but because the pure oxygen used in them is toxic at depths greater than 25 feet they were extremely dangerous. Cousteau and Gagnan were the first to successfully develop the demand-type regulator in 1943.

B. Safety Procedures

1. Always dive with a buddy--never dive alone.

2. Always wear a safety float.

3. Always use the standard diver's flag to mark where you are diving.

4. Never hold your breath while ascending.

5. Always carry a snorkel with scuba gear. It is easier to swim with one than to have to breathe with your head up when returning to boat or shore.

6. Use quick-release hitches on scuba gear and weight belt.

7. Never dive with ear plugs or with a cold.

8. Never dive when tired or fatigued.

9. Always use care when transporting the tanks and have them inspected at regular intervals.

C. Principles and Physiological Effects of Skin and Scuba Diving

1. Dalton's Law. In a mixture of gases, each gas exerts a pressure proportional to the percentage of the total gas which it represents. Example: Approximately 21 molecules of oxygen are found in every 100 molecules of total gas. Therefore, oxygen represents about 1/5 of the total pressure.

2. Charles' Law. If pressure is held constant, the volume of a gas will vary directly with the absolute temperature. Example: P(pressure) = kT (absolute temperature)
V(volume) = kT

3. Boyle's Law. At a constant temperature, the volume of a gas varies inversely with pressure. Example: PV=kT.

4. Archimedes' Principle. A body immersed in a liquid is bouyed upward by a force equal to the weight of the water if displaces.

5. Henry's Law. The components of a mixture of gases in contact with a liquid will dissolve in direct proportion to their partial pressures.

6. Air Embolism. This can be the most serious of all diving accidents. This occurs when the diver fails to exhale while ascending. The gases inside the diver's lungs expand, (Boyle's Law), thus causing one of three things:

   a. Air may push through the tissue of the lungs and enter the skin around the neck area.
   b. Air may enter the spaces between the lungs and cause a pneumothorax.
   c. Air may be forced into the blood stream and carried to the brain or other vital organs.

   If an air embolism occurs, recompression is necessary so that the victim lives. Most people will feel pressure building and will automatically exhale, but in the case of an unconscious victim, his buddy should hit him in his stomach when bringing him to the surface.

7. Decompression Sickness (Bends). This occurs when a diver breathes air for prolonged periods of time at great depths. The compressed air under pressure results in great amounts of nitrogen that is absorbed into the blood stream. Bends may also occur if the diver ascends too fast. The nitrogen can cause blindness, unconsciousness, convulsions or other such effects. These pains may occur immediately or any time up to 24 hours after the dive. The only remedy is recompression. To prevent the "Bends", the diver should limit himself to one dive in a 12 hour period of time (one 70 cubic foot tank), or become familiar with the Navy Decompression Tables listed in another section.

8. Nitrogen Narcosis. This affects divers much like an alcoholic beverage. It is known that breathing nitrogen at depths greater than 100 feet has a depressing effect on the nervous system. There are no permanent after effects except from those of poor judgement. Remember, the maximum depth for a scuba is 200 feet, and the safety limit is 100 feet.

9. Squeeze. This is the inability to equalize pressure especially common in the sinus cavities and ears. If a squeeze occurs in the ears, the diver should not descent any further but should equalize the pressure by holding his nose and keeping his mouth closed, forcefully exhale. Never descend when one feels pain, eardrums may rupture, thus relieving pain but the effect of the cold water on the eardrum may cause dizziness. Sinus squeeze and lung squeeze are also common among divers. If one feels pressure around the nose, eyes or lungs, he should not descend any further.

10. Carbon Monoxide Poisoning. A diver must be certain that the compressed air in his tank is clean and filtered, or that if he is using a compressor be sure that the air intake is away from engine exhaust. If carbon monoxide fumes are breathed, the diver may become unconscious.

11. Oxygen Poisoning. Breathing pure oxygen has a toxic effect on the brain, and while oxygen poisoning itself leave no permanent injury, the consequences may.. Oxygen poisoning occurs usually when the closed circuit breathing apparatus is used at depths greater than 60 feet.

12. Anoxia. This is lack of oxygen. Anyone who begins to run out of air should immediately begin to ascend.

13. Cold Weather. Efficiency is lost due to cold water and fatigue sets in quickly in water below 60 degrees F. Rubber suits are extremely helpful in combating the effects of cold weather and water.

D. Terminology

1. Absolute Pressure. True Pressure. The addition of 14.7 lbs. to indicated gauge pressure.

2. Apparatus. Materials or parts designed for a specific purpose or operation.

3. Breathing Air. Air that is free of all contsminating parts and is commercially prepared for underwater use.

4. Breathing Device. Apparatus used to breathe underwater.

5. Buddy Breathing. Sharing a tank of air with one or more persons. An emergency use only.

6. Buoyancy. The force exerted upward on an object that is placed in a fluid of greater density.

7. Cylinder. A compressed gas breathing container.

8. Decompression. The ability to release pressures.

9. Exhale. Breathing out.

10. Fins. Devices attached to feet to increase area.

11. Flotation Gear. A device to aid in supporting a diver. Usually an emergency apparatus.

12. Gauge Pressure. The change from normal atmospheric pressure level shown on an instrument.

13. Inhale. The act of breathing in.

14. Hyperventilation. Deep breathing in a fast manner in order to improve the ability to hold the breath.

15. Nausea. A sickish feeling, often creating a desire to vomit.

16. Physics of Diving. The science of matter and motion relating to man's activity underwater.

17. Physiology of Diving. The effects on functions of human organs while in a water environment.

18. Recompression. Returning a diver to the greatest depths endured during a dive to eliminate the effects of air embolism or decompression sickness.

19. Regulator. An automatic device for maintaining the flow of air equal to the pressure of the water.

20. Rubber Suit. Covering for a diver used to insulate and preserve body heat. Classified as "wet" and "dry".

21. SCUBA. Self-Contained Underwater Breathing Apparatus.

22. Snorkel. A "J" shaped tube with a mouthpiece and another open end. Used to permit breathing without turning the head. The snorkel protrudes above the surface of the water.

23. Sport Diver. A person who dives with or without scuba gear for pure enjoyment, photography, spearfishing, or exploring.

24. Tanks. Containers for compressed gas.

25. Valve. A device that regulates the flow of air or gas used in diving equipment.

26. Volume. A measurement of space by cubic units.

27. Yoke. A device for attaching regulators to tanks so as to make a leakproof seal.

E. Social and Ethical Values

1. Skin and scuba diving are sports that are a valuable leisure time activity for boys, girls, men, and women.

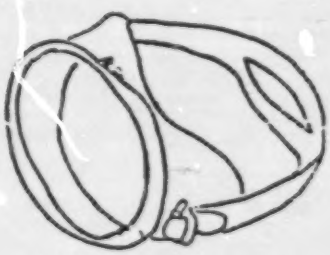
2. The activities are physically demanding and will most certainly help keep one physically fit.

3. As one's skills increase so does the wide variety of activities for underwater sport diving; photography, spearfishing, exploring, salvaging, and unlimited other activities.

4. The total process of diving is extremely simple for anyone with a high degree of swimming skill and therefore, it does not take much effort to open new and exciting doors to a whole new world of fun.

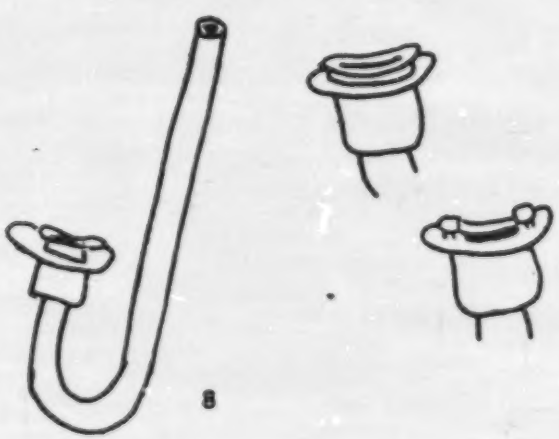
F. Proper Care and Use of Skin and Scuba Equipment

1. Mask. Choice should be governed by comfort, protective seal, size, and shape. The mask should only cover the nose and eyes. When trying a mask on place it over nose and eyes, inhale and the mask should remain on your fact until you exhale. Adjustable head strap, shatterproof lens and a metal restraining band are a must. Avoid scratching the lens, and any contact with oil or grease. Always rinse mask after every use.



Mask

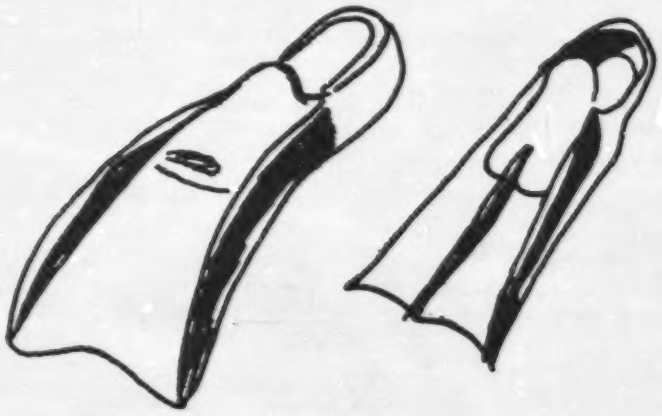
2. Snorkel. Usually a "J" shaped design of rubber, plastic or synthetic combination. The tube is generally 12-14 inches in length. The mouthpiece should be comfortable, while the snorkel should be light, simple and attachable to the mask. Again always rinse the snorkel after each use, and check for defects before and after using.



Snorkel

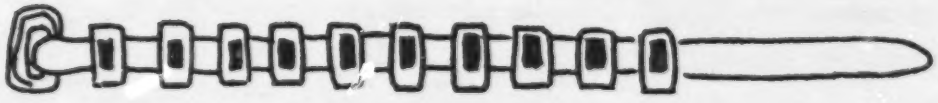
3. Fins. Fins are designed in two basic shapes: Open-Heel and Slipper. The slipper fin is made of one piece and has no opening at the heel, therefore, it is more protective than the Open-Heel type. Blade area, outline, curvature, and stiffening of the ribs all vary with each design to insure comfort and the most efficient control for the individual. Most fins will fit every two shoe sizes.

   Never walk with fins on unless you walk backwards. The back of the heel is the weakest part of the fin, always put on by pulling the sides of the heel.



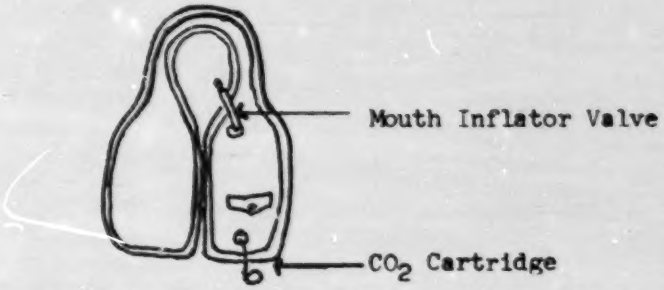
Fins

4. Weight Belt. This is essential for divers who have trouble submerging and remaining so. The belt should be sturdy, comfortable and equipped with double "D" rings so that a quick release hitch may be used. Weights should be easy to add or remove if necessary. The weight belt should be the last piece of equipment on and the first to come off.



Weight Belt

5. Personal Safety Float. An essential piece of equipment used for emergencies only. It is a vest type preserver that inflates with either a CO_2 cartridge or by mouth.



6. Tanks. Tanks are available in single, double or triple tank units, each containing 71.2 cubic feet of compressed air. Air is usually compressed to 2000 pounds of pressure per square inch. Because of the great pressure, tanks must be treated very carefully. A rupture or broken valve may send the tank flying.

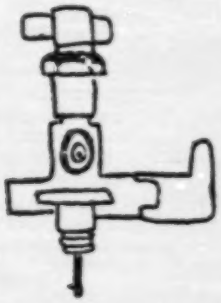
   Tanks must be checked periodically for corrosion. Tanks must be submerged in water when filling them, this cools the tank and enables checks for leaks. Nothing but clear air should be used in the tanks. Tanks should be secured when transporting, and the Interstate Commerce Commission states that a tank must be hydrostatically tested every five years.

Tank with "J" Valve

7. Valves. A valve controls the flow of air from the tank. There are two major designs of valves with a third valve design not commonly used.

   "K" valves have no reserve and simply opens the air supply from the tank. "J" valves do not have a reserve of constant air. As soon as the pressure drops below 300 psi, the spring on the valve closes the opening and the diver must pull the reserve lever down to use the reserve supply of air. There is enough air to insure the diver a safe ascent.

"R" valves are not as common as "K" and "J" valves and these valves make breathing difficult when pressure has dropped. Therefore, the diver must ascend to receive more air.



"J" Valve

8. Back Pack. The back pack keeps the tanks in a comfortable position on the diver's back-no matter what position the diver is in. The pack must have emergency releases of some sort, the easiest being the quick-release type.

Back Pack with Harness

9. Regulator. These should be a tested design but it is the diver's choice as to either a double or single hose type. The regulator controls the amount of air by the diver's breathing and the surrounding water.

Single
Hose
Regular

Double
Hose
Regular

10. Diver's Flag. This is a must if you plan to dive where there is any boat traffic at all. Use it to protect yourself.

Diver's Flag

11. Non-Essential Equipment. The following list of pieces of equipment are not essential for diving, but can add to comfort or further enjoyment of the sport.

    a. Wet or Dry Suit
    b. Knife
    c. Speargun
    d. Gloves
    e. Watch
    f. Depth gauge
    g. Compass

G. Basic Skills of Skin and Scuba Diving

1. Underwater Swimming. Usually the arms are not used while swimming underwater and the legs are forced to propel one through the water. The most efficient leg action is one like the freestyle flutter kick only with greater knee flexibility and not as quick as the flutter kick.

2. Submerging. This is the means the diver employs to get his body underwater. There are several ways to submerge, but the most common and effective are pike surface dive and feet-first surface dive.

    a. Pike surface dive is accomplished by beginning in a prone position, pulling both arms back to the sides, dropping the head, and lifting the legs up and together out of the water. The weight of the legs forces the body underwater. Start kicking after your body is completely submerged.
    b. Feet-first surface dive is accomplished by raising the body out of the water with a strong kick then let the body downward and under the water. As soon as your downward motion stops, bend at the hips and continue to swim underwater.

3. Clearing the Mask. This skill must be mastered to insure the diver's safety while underwater. Simply roll the head backward so that the face is turned toward the surface. With the heel of the hand against the top of the mask, press against the mask and exhale thus forcing the water to leave the bottom of the mask.

4. Clearing the Snorkel. To clear the snorkel simple submerge until the entire snorkel is underwater. Ascend until the tip of the snorkel is above the surface then forcefully exhale and blow the water out of the snorkel. Be sure to save enough breath to force all of the water out of the snorkel.

5. Proper use of the fins. Slip the foot into the pocket of the fin and gently pull the fin on using the side of the heel to properly position the fin on your foot. It may be easier to dip the fin in the water before trying to slip it on.

6. Equalizing pressures. If pressure begins to build in your ears, do not descend any further. Apply pressure to your nose and keep your mouth closed. Exhale until the pressure in your ears has ceased. If pressure continues ascend at once.

7. Assembling the Equipment. Always carry the tanks by the valve and never by the regulator. Remove the dust cap from the regulator and attach the regulator to the valve with the hose on the right side of the tank, (for single hose regulators). Place the regulator at approximately the 1 o'clock position. Turn the air on and breathe through the mouthpiece to be sure everything is functioning properly.

8. Donning the Equipment. With a partner helping you get your equipment on it is a rather simple operation. Place all equipment as close to your entry point as possible. Slip the tanks on first and adjust the pack straps so the regulator will not hit your head. Be sure all straps are fastened with a safety hitch. If you are going to walk into the water do not put your mask, fins and snorkel on until in the water. Otherwise, if you plan to drop into the water, put your mask and snorkel on, then your fins, then the weight belt. Place the mask over your face, fit the mouthpiece in your mouth and hold on to the mask and mouthpiece with one hand and the harness strap with the other.

9. Entering the water. There are three basic ways to enter the water: a. Walk in, b. Spread-Eagle, and c. Roll-in. The walk in method is just simple walking into the water. The Spread-eagle method is much like a life saving jump with one hand on the mask and mouthpiece and the other on the strap so the tank will not hit the head when entering. The roll off entry may be executed from a forward or backward position and is similiar to a somersault, except the diver must land tanks down. Again hold on to the mask, mouthpiece and tank.

10. Underwater breathing. When breathing compressed air, it is most important to remember to breath normally and relaxed. Do not forcefully inhale or exhale. Also do not try to save your air or make your tanks last longer by holding your breath.

11. Clearing the mouthpiece. If any time the mouthpiece should fill with water, one must know how to clear it. For a single hose regulator, simply press the exhaust button and put the mouthpiece in your mouth while the button is still pressed. For a double hose regulator, tilt the head to the left, exhale forcefully and let the water escape through the exhaust valve.

V. LEARNING ACTIVITIES

A. Recommended Warm-up Exercises

1. Swim 200 yards without fins, mask or snorkel.

2. Swim 200 yards with fins.

3. Swim 400 yards with fins, mask and snorkel, diving underwater, filling the snorkel, then surfacing and clearing the snorkel.

B. Lead-Up Activities

1. Blind Man. With pieces of black rubber cut in circles, place a circle in each student's mask. Each student has fins, mask and snorkel and is told to follow the edge of the pool around all four sides, surfacing to get a breath of air when needed. The students are told that if they should run into any object, they must feel their way around it. The right hand should be against the side of the pool while the left arm is in front of their head to protect it. Have students move around to be "objects" and place tanks or other objects on the bottom.

   This activity is very good for an emotional stability test. A diver must never lost control of his emotions while underwater, and he must always use his head and be prepared for the unknown.

   When the use of tanks has been introduced, this may be repeated forcing each student to make an entire circle around the pool underwater.

2. Recovery of mask, fins, and snorkel. Each student should attempt the following drill until he can successfully complete the entire drill with one breath of air.

   Place each student's mask, fins, and snorkel on the bottom of the pool. Each student must then try to recover his own equipment. The mask and snorkel must be cleared and the fins must be put on with only the breath that the student descended with.

   This activity is excellent for breath control. If the instructor would like to score this drill, one point could be awarded for each fin put on, for putting the mask on, clearing the mask, and clearing the snorkel, for a possible 5 points.

3. Station Breathing. This activity should be practiced in two different methods. First with the use of mask, fins, and snorkel, then without any accessories.

The object is to swim underwater to the first station, take a couple of breaths from the tank at that station, then proceed to the next station. No more than two breaths may be taken at any one station. Each student should strive to complete the entire course.

4. Buddy Breathing. Whenever a diver exhausts his supply of air, it is a must to be able to return to the surface. A diver must signal his buddy that he is out of air (signal by drawing a finger across his throat) and they must then share one tank.

   To practice this skill, both divers should submerge with the diver with the full tank on his buddy's right side. The diver with the full tank must keep his hand on the mouthpiece and pass it to his buddy. Each diver should take two breaths of air then pass the mouthpiece. The diver who has run out of air should hold on to his buddy's tank at the valve and simply guide the mouthpiece into his mouth, take two breaths and then pass it back.

   This may be practiced by moving underwater from one end of the pool to the other and back. Remember to exhale when ascending!

5. Doff and Don. When a diver can successfully complete the following drill he is ready for an open water dive.

   With all equipment on, the diver surface dives to the bottom of the pool, and sits with his legs extended in front of him. Remove the weight belt and place it across the thighs, take the fins off and place them under the knees. Release the waist strap and reach overhead and grasp the valve. Swing the tank overhead and place it between the legs. Place the weight belt over the tank and the fins und under the tank, then move to a prone position. Take a couple of deep breaths, turn off the regulator, and surface, exhaling all the way to the surface.

   After catching your breath, submerge and find the mouthpiece of the regulator first. Clear it and replace it in your mouth, turn the regulator on. Next, replace the mask and clear it, then sit down placing the weight belt across your thighs. Adjust the scuba tank and harness so that you can flip it into position over your head. Strap the waist band on with a safety hitch, then put your fins on, then the weight belt, and return to the surface.

C. Suggested Structure of Activities

1. Teaching of any subject can be approached in any number of ways:

   a. Inductive Approach. Teaching the parts to the whole. Skills and rules for beginning skin and scuba diving are thoroughly explained, demonstrated, and practiced through drills before the student is taken into the ocean for a true dive.
   b. Deductive Approach. Teaching from the whole to the parts. Explanations, demonstrations and drills are held to a minimum as concentration is on teaching an overview of beginning skin and scuba diving. The student is moved quickly into a dive situation, and drills and reviews accent the daily activities.
   c. Combination of Inductive and Deductive Approaches. This combination of approaches allows the student to get an overview of diving and an understanding of the basic skills. When the student is later moved into the actual dive, drills, demonstrations and explanations are injected as a planned sequence and whenever the progress of the student indicates the necessity of a review or introduction of a new skill. This combination approach enables the student to see the relevance for the building of physical skills necessary to dive.

2. The purpose of the following grouping of materials is written strictly as a point of reference. Teacher preference, school facilities, group ability, and group progress should dictate the sequence of presentation.

   a. Orientation
      (1) Purpose and course objectives
      (2) History
      (3) Values
      (4) Science of diving
      (5) Physical effects and accidents
      (6) Safety procedures
      (7) Suggested resource materials
   b. Basic skills
      (1) Breath control
      (2) Use of mask and adjustment to pressure
      (3) Use of fins
      (4) Use of snorkel
   c. Principles and science of diving
      (1) Physics of diving
      (2) Physiology of diving
      (3) Diving diseases and accidents
   d. Fundamental skills
      (1) Adjustment to equipment
      (2) Use of regulator
      (3) Breathing with gear in shallow water

(4) Underwater swimming with gear
(5) Clearing mask
(6) Entries
(7) Buddy breathing

e. Lifesaving skills
(1) Doff and Don
(2) Swimming rescues
(3) Artificial respiration

D. Recommended Resources for Teachers

The following lists are not exhaustive, nor are they intended as recommendations for purchase. Each teacher should preview and evaluate materials before using them. Titles of films and filmstrips that may be ordered from Dade County Audio-Visual Services are followed by catalog numbers. Forms for ordering these materials may be obtained from the school's audio-visual representative.

1. Books

a. Council for National Co-Operation in Aquatics. The New Science of Skin and Scuba Diving. New York: Associated Press, 1968.
b. Counsilman, James and Drinkwater, Barbara. Beginning Skin and Scuba Diving. Belmont, California: Wadsworth Publishing Company, 1965.
c. Craig, John D. and Dean, Morgan. Invitation to Skin and Scuba Diving. New York: Simon and Schuster, 1965.
d. Gabrielsen, M. Alexander, Spears, Betty, and Gabrielsen, B. W. Aquatics Handbook, Second Edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968.
e. Halacy, D. S. Jr., The In Sports. Philadelphia: Macrae Smith Company, 1966.
f. Tillman, Albert A., Skin and Scuba Diving. Dubuque, Iowa: William C. Brown Company Publishers, 1966.
g. Tinker, Gene. Skin Diving Made Easy. St. Louis: World Color Press, Inc., 1967.

2. Magazines, Guides, and Bulletins

a. Kenley, Don C. ed., Manual for Skin and Scuba Diving Qualifications.
b. Tinker, Gene. Skin Diver. Petersen Publishing Company, Los Angeles.

3. Films

a. Breath of Life. Classroom Film Distributors, 1958, 30 30 min., Color.
b. Introduction to Skin Diving. Audio-Visual Service, Department of Cinema, University Park, Los Angeles, Calif.: 1958, 27 min., Color.
c. Technique of Skin Diving. Coast Visual Education Co., 1956, 10 min., B & W.

E. Recommended Resources for Pupils

1. Study Guide (course content)

2. Books

a. Council for National Co-operation in Aquatics. The New Science of Skin and Scuba Diving. New York: Associated Press, 1968.
b. Counsilman, James and Drinkwater, Barbar. Beginning Skin and Scuba Diving. Belmont, California: Wadsworth Publishing Company, 1965.
c. Tillman, Albert A., Skin and Scuba Diving. Dubuque, Iowa: William C. Brown Company Publishers, 1966.

3. Magazines and Guides

a. Kenley, Don C. ed., Manual for Skin and Scuba Diving Qualifications.
b. Tinker, Gene. Skin Diver. Petersen Publishing Company, Los Angeles.

VI. EVALUATION PLANS

A. Skills Tests

1. Buddy Breathing

a. Purpose. To measure the stability and skill of the students, and to test for signs of panic.

b. Equipment.
   (1) Masks, fins, and snorkles
   (2) Weight belts
   (3) Tanks and regulators
   (4) Pool

c. Procedure. Pair off students in the class and instruct them to swim two lengths of the pool breathing from one tank. The instructor should swim along the surface above the pair checking their technique.

d. Scoring. One point is given for each of the following steps completed properly: Buddy with empty tank on the left, breathing 2 breaths then passing the regulator, holding on to each other, buddy with full tank must have control over his buddy and the mouthpiece. Total of 5 possible points for each person.

2. Station Breathing.

a. Purpose. To measure lung capacity and the ability to clear the mouthpiece properly. Also a good test for judging swimming abilities.

b. Equipment.
   (1) 5 tanks with regulators
   (2) Weight belts to hold the tanks down

c. Procedure. Each student is instructed to swim underwater to the first tank, clear the mouthpiece, take two breaths of air and proceed to the next tank. Be sure to instruct each pupil to swim at their own pace but to remember that there are people in front of them as well as as behind them.

d. Scoring. One point is awarded for each station that the student successfully completes without surfacing between tanks for a breath of air.

3. Entries

a. Purpose. To measure how well each student has learned to enter the water with complete scuba gear on.

b. Equipment.
   (1) Mask
   (2) Fins
   (3) Snorkel
   (4) Weight belts
   (5) Tanks
   (6) Regulators

c. Procedure. Each student will don all scuba gear and will enter the water the following ways:
   (1) Spread-eagle
   (2) Forward roll-in
   (3) Backward roll-in
d. Scoring. One point will be awarded for each successful entry into the water.

4. Doff and Don

a. Purpose. To measure familiarity with each piece of equipment and how to don each piece under water and to clear the mouthpiece and mask.
b. Equipment.
   (1) Mask
   (2) Fins
   (3) Snorkel
   (4) Weight belts
   (5) Tanks
   (6) Regulators
c. Procedure. Each student will don all equipment above the water, enter the pool, sink to the bottom, and doff the equipment. After the student has caught his breath, he must submerge himself and don his equipment under the water.
d. Scoring. A total of 10 points will be given for completing the test properly.

5. Retrieving Mask, Fins and Snorkel

a. Purpose. To measure lung capacity, swimming ability, and the ability to clear mask and snorkel.
b. Equipment.
   (1) Mask
   (2) Fins
   (3) Snorkel
c. Procedure. Each student will drop his mask, fins and snorkel into 10 feet of water. He will then be instructed to surface dive, put his fins, mask and snorkel on, and clear his mask and snorkel without surfacing for a breath of air.
d. Scoring. One point will be awarded for each piece of equipment put on and cleared before coming up for a breath of air.

BIBLIOGRAPHY

Books

Council for National Co-operation in Aquatics, The New Science of Skin and Scuba Diving. New York: Associated Press, 1968.

Counsilman, James and Drinkwater, Barbara. Beginning Skin and Scuba Diving. Belmont, California: Wadsworth Publishing Company, 1965.

Gabrielsen, M. Alexander, Spears, Betty, and Gabrielsen, B. W., Aquatics Handbook, Second Edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968.

Tillman, Albert A. Skin and Scuba Diving. Dubuque, Iowa: William C. Brown Company Publishers, 1966.

Rinker, Gene. Skin Diving Made Easy. St. Louis: World Color Press, Inc., 1967.

Bulletins

Kenley, Don C. ed., Manual for Skin and Scuba Diving Qualification.